

APL/DTCTM

REFERENCE

CARD

5/7/80

TABLE 1

APL/DTC CHARACTER SET

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	1	2	3	4	5	6	7	8	9																
¨ DIERESIS										α ALPHA						⋈ NOR				~ v					
¯ OVERBAR										⌈ UPSTILE						⋈ NAND				~ ^					
< LESS										⌋ DOWNSTILE						⋈ DEL STILE				∇					
≤ NOT GREATER										⌋ UNDERBAR						Δ DELTA STILE				Δ					
= EQUAL										∇ DEL						⊙ CIRCLE STILE				○					
≥ NOT LESS										Δ DELTA						⊙ CIRCLE SLOPE				○ \					
> GREATER										• NULL															
≠ NOT EQUAL										' QUOTE						• LOG				* ○					
∨ OR										□ QUAD															
^ AND										(OPEN PAREN						⋈ DEL TILDE				∇ ~					
- BAR) CLOSE PAREN						± BASE NULL				⊥ •					
÷ DIVIDE										[OPEN BRACKET						∇ TOP NULL				⊥ •					
+ PLUS] CLOSE BRACKET						← LEFT ARROW									
× TIMES										< OPEN SHOE						/ SLASH									
? QUERY										> CLOSE SHOE						SPACE									
ω OMEGA										∩ CAP						∩ CAP NULL				∩ •					
ε EPSILON										∪ CUP						□ QUOTE QUAD				' □					
ρ RHO										⊥ BASE						! QUOTE DOT				' .					
~ TILDE										⊥ TOP															
↑ UP ARROW										STILE						↓ DOWN ARROW									
ι IOTA										; SEMICOLON						:				:					
○ CIRCLE										, COMMA						*				*					
→ RIGHT ARROW										. DOT						\ SLOPE									

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TABLE 2

APL/DTC SCALAR FUNCTIONS

MONADIC FORM			DYADIC FORM		
SYNTAX	NAME	NOTES	F	SYNTAX	NAME NOTES
+ A	CONJUGATE		+	A + B	PLUS
- A	NEGATIVE		-	A - B	MINUS
× A	SIGNUM		×	A × B	TIMES
÷ A	RECIPIROCAL		÷	A ÷ B	DIVIDE
A	ABSOLUTE VALUE			A B	RESIDUE
⌊ A	FLOOR		⌊	A ⌊ B	MINIMUM
⌈ A	CEILING		⌈	A ⌈ B	MAXIMUM
? A	ROLL	1	?	A ? B	DEAL 1
* A	EXPONENTIAL		*	A * B	POWER
• A	NATURAL LOG		•	A • B	LOGARITHM
○ A	PI TIMES		○	A ○ B	CIRCULAR 2
! A	FACTORIAL	3	!	A ! B	BINOMIAL
~ A	NOT		~		
NOTES: 1. (A,B) ∈ 165535 2. A ∈ 0 1 2 3 4 3. GAMMA FUNCTION IMPLEMENTED AS A DEFINED FUNCTION.			^	A ^ B	AND
			v	A v B	OR
			∧	A ∧ B	NAND
			∨	A ∨ B	NOR
			<	A < B	LESS
			≤	A ≤ B	NOT GREATER
			=	A = B	EQUAL
			≥	A ≥ B	NOT LESS
			>	A > B	GREATER
			≠	A ≠ B	NOT EQUAL

TABLE 3

APL/DTC MIXED FUNCTIONS

MONADIC FORM			DYADIC FORM		
SYNTAX	NAME	NOTES	F	SYNTAX	NAME NOTES
ρ A	SHAPE		ρ	V ρ A	RESHAPE
, A	RAVEL		,	A , A	CATENATE 1
Φ V	REVERSAL		Φ	S Φ V	ROTATE
⌵ M	TRANSPOSE		⌵		
			†	S † V	TAKE
			‡	S ‡ V	DROP
			/	V / A	COMPRESS
			\	V \ A	EXPAND
			[]	A[V;...;V]	INDEXING
ι S	INDEX GENERATOR		ι	V ι A	INDEX OF
			ε	A ε A	MEMBERSHIP
⧻ V	GRADE UP		⧻		
▽ V	GRADE DOWN		▽		
			⌈	V ⌈ V	DECODE
			⌊	V ⌊ S	ENCODE
⌵ V	EXECUTE 2		⌵		
			⌵	V ⌵ A	FORMAT 3

NOTATIONS: S - SCALAR, V - VECTOR, A - ARRAY (RANK 8 MAX)

1. LAMINATION IMPLEMENTED AS A DEFINED FUNCTION

2. 120 ≥ pV

3. 2 = pV

TABLE 4

APL/DTC OPERATORS

OPERATOR	SYNTAX
REDUCTION	S / A
SCAN	S \ V
INNER PRODUCT	A S S A
OUTER PRODUCT	A • S A
AXIS	O [N] A

FOR REDUCTION AND
SCAN. AXIS ALSO
APPLIES TO CERTAIN
MIXED FUNCTIONS.

S - SCALAR DYADIC FUNCTION

A - ARRAY

O - OPERATOR

N - AXIS

V - SCALAR OR VECTOR

TABLE 5

APL/DTC SYSTEM COMMANDS

COMMAND	FUNCTION
CONSOLE CONTROL	
)OFF	RETURN TO HOST OPERATING SYSTEM
ACTIVE WORKSPACE	
)CLEAR	FURNISH CLEAR WORKSPACE
)COPY COPYOBJECT	COPY A COPYOBJECT INTO WORKSPACE
)ERASE NAMES	ERASE OBJECTS
)LOAD WSID	ACTIVATE A COPY OF NAMED WS
)WSID [WSID]	CHANGE OR LIST ACTIVE WS NAME
LIBRARY CONTROL	
)DROP WSID	DROP A WORKSPACE FROM LIBRARY
)SAVE [WSID]	SAVE NAMED WORKSPACE IN LIBRARY
)CDROP COPYOBJECT	DROP A COPYOBJECT FROM LIBRARY
)CSAVE COPYOBJECT	SAVE NAMED COPYOBJECT IN LIBRARY
SYSTEM PARAMETERS	
)WIDTH N	SET PRINT WIDTH $25 \leq N \leq 255$
)DIGITS N	SET PRINT PRECISION $1 \leq N \leq 10$
)SYMBOLS N	SET SYMBOL TABLE SIZE $0 \leq N \leq 503$
)ORIGIN N	SET INDEX ORIGIN $N \leq 0 \ 1$
INQUIRY	
)FNS [ALPHA]	LIST FUNCTIONS IN ACTIVE WS
)VARS [ALPHA]	LIST VARIABLES IN ACTIVE WS
)SVARS [ALPHA]	LIST SHARED VARS IN ACTIVE WS
)SI	LIST HALTED FUNCTIONS
)SIV	LIST HALTED FUNCTIONS AND VARS
)LIB	LIST LIBRARY ON ACTIVE DISK UNIT
)CLIB	LIST COPYOBJECTS ON ACTIVE DISK

TABLE 6

APL/DTC SYSTEM VARIABLES

NAME	FUNCTION	VALUE IN CLEAR WS	RANGE
<input type="checkbox"/> O	INDEX ORIGIN	1	0 1
<input type="checkbox"/> P	PRINT PRECISION	8	1 10
<input type="checkbox"/> W	PRINT WIDTH	80	24+1231
<input type="checkbox"/> L	RANDOM LINK	34952	165535
<input type="checkbox"/> C	LINE COUNTER		
<input type="checkbox"/> A	WORKSPACE AVAILABLE		
<input type="checkbox"/> H	CONSOLE DISPLAY <input type="checkbox"/> H+0 (PAGEING) <input type="checkbox"/> H+1 (ENABLE PRINT) <input type="checkbox"/> H+2 (SCROLLING)		0 1 2
<input type="checkbox"/> V	ATOMIC VECTOR		
<input type="checkbox"/> U	SPECIFY ACTIVE DISK UNIT <input type="checkbox"/> U+251 (DISABLE ATTN) <input type="checkbox"/> U+252 (ENABLE ATTN) <input type="checkbox"/> H+253 (ASCII CHARS) <input type="checkbox"/> H+254 (APL CHARS)		1250
<input type="checkbox"/> X	LATENT EXPRESSION	<input type="checkbox"/> V[1]	CHARACTER
<input type="checkbox"/> D	DATE		
<input type="checkbox"/> T	TIME		
<input type="checkbox"/> M	APL/DTC SERIAL NO.		

TABLE 7

APL/DTC SYSTEM FUNCTIONS

SYSTEM FUNCTION	PURPOSE
P <input type="checkbox"/> S C	INITIATE, OR OFFER, A SHARE
P <input type="checkbox"/> R C	RETRACT A SHARE
<input type="checkbox"/> K N	CANONICAL REPRESENTATION
<input type="checkbox"/> F R	FIX
<input type="checkbox"/> N S	NAME LIST

P - PROCESSOR ID NUMBER (SCALAR INTEGER VALUE)

C - RANK 0 OR 1 CHARACTER STRING WHICH IS THE NAME OF A VARIABLE.

N - RANK 0 OR 1 CHARACTER STRING WHICH IS THE NAME OF A FUNCTION.

R - RANK 1 CHARACTER STRING WHICH IS A CANONICAL REPRESENTATION OF A FUNCTION.

S - SCALAR NUMERIC VALUE ($S \in 0 \ 1$)

0 - LIST FUNCTION NAMES, 1 - LIST VARIABLE NAMES

TABLE 8

APL/DTC ERROR MESSAGES

TYPE	CAUSE
DEFN	MISUSE OF V, OR ERROR IN FN EDITING
DOMAIN	ARGUMENTS NOT IN DOMAIN OF FUNCTION
INDEX	INDEX VALUE OUT OF RANGE
INTERRUPT	EXECUTION WAS SUSPENDED WITHIN AN EXPRESSION
LENGTH	SHAPES NOT CONFORMABLE
RANK	RANKS NOT CONFORMABLE
SYNTAX	INVALID SYNTAX
SYMBOL TABLE FULL	TOO MANY NAMES IN USE
SYSTEM	INTERNAL SYSTEM PROBLEMS
VALUE	USE OF A NAME WHOSE VALUE OR DEFINITION HAS NOT BEEN SPECIFIED
WS FULL	WORKSPACE IS FILLED
NONCE	NOT IMPLIMENTED IN THIS VERSION
NO SPACE	AFTER)SAVE NO DISK SPACE AFTER)COPY OBJECT TOO LARGE
I/O ERROR	AN I/O ERROR HAS OCCURRED
NOT FOUND	OBJECT OR WORKSPACE NOT FOUND IN LIBRARY.
INCORRECT COMMAND	IMPROPERLY FORMED COMMAND
NOT WITH SI	SYSTEM COMMAND NOT PERMITTED WITH SUSPENDED EXECUTION
NOT WITH OPEN DEFN	SYSTEM COMMAND NOT PERMITTED WITH OPEN DEFINITION

APL/DTC I/O PROCESSOR (100)

CONTROL VARIABLE INITIAL VALUE: 'CTL'
 VALUE MUST BE INTEGER SCALAR PORT NUMBER

DATA VARIABLE INITIAL VALUE: NONE

ASSIGNING I/O PORT (SPECIFYING THE CONTROL VARIABLE)

RETURN CODES (ACCESSING THE CONTROL VARIABLE)

- 0-SUCCESSFUL OPERATION
- 1-INCORRECT INITIAL INFORMATION AT SHARE OFFER
- 2-INVALID SPECIFICATION OF CONTROL OR DATA VAR
- 3-CONTROL VARIABLE NOT SPECIFIED A SCALAR
- 4-CONTROL VARIABLE NOT SPECIFIED A VALID PORT NO.

APL/DTC CP/M FILE INPUT PROCESSOR (101)

DATA VARIABLE INITIAL VALUE: NONE

SPECIFYING A FILE NAME
 AFTER SHARE OFFER THE DATA VARIABLE MUST BE SPECIFIED
 WITH THE VALUE 'NNNNNNNEE'

WHERE
 NNNNNNN=8 CHARACTER FILENAME
 EEE=3 CHARACTER FILENAME EXTENSION

READING THE FILE (ACCESSING THE DATA VARIABLE)
 THE FIRST ACCESS GIVES THE RETURN CODE
 0-SUCCESSFUL OPERATION
 THE SECOND AND SUBSEQUENT ACCESSES GIVE
 ONE BY ONE THE 128 BYTE RECORDS IN THE FILE.
 END OF FILE IS DETECTED BY AN EMPTY VALUE
 FOR THE DATA VARIABLE.

APL/DTC COMMUNICATIONS PROCESSOR (102)

CONTROL VARIABLE INITIAL VALUE: 'CTL'

DATA VARIABLE INITIAL VALUE: 'BSPEC'

WHERE
 B=BAUD RATE, VALUE OF 0=110 BAUD, 1=300 BAUD
 S=STOP BITS, VALUE OF 0=1 STOP BIT, 1=2 STOP BITS
 P=PARITY, VALUE OF 0=PARITY ON, 1=PARITY OFF
 E=PARITY TYPE, VALUE OF 0=ODD, 1=EVEN
 C=BITS PER CHAR, RANGE 4+14

COMMANDS (SPECIFYING THE CONTROL VARIABLE)

VALUE	MEANING
'H'	HANG UP TELEPHONE
'B'	SEND BREAK (CTRL B IN TERMINAL EMULATOR MODE)
'A'	ENTER AUTO ANSWER MODE
'PHONE NO'	DIAL PHONE NUMBER
'EHA'	ENTER TERMINAL MODE, HALF DUP, AUTO LF
'EHN'	ENTER TERMINAL MODE, HALF DUP, NO LF
'EFA'	ENTER TERMINAL MODE, FULL DUP, AUTO LF
'EFN'	ENTER TERMINAL MODE, FULL DUP, NO LF
'TBO'	BLOCK MODE, B=END OF BLOCK CHAR, OVERSTRIKES
'TBN'	BLOCK MODE, B=END OF BLOCK CHAR, NO OVERSTRIKES
'LI',TAB	LOAD INPUT TRANSLATE TABLE FROM TAB
'LO',TAB	LOAD OUTPUT TRANSLATE TABLE FROM TAB
'LS',TAB	LOAD SCREEN TRANSLATE TABLE FROM TAB

RETURN CODES (ACCESSING THE CONTROL VARIABLE)

- 0-SUCCESSFUL OPERATION
- 1-INCORRECT INITIAL VALUES AT SHARE OFFER
- 2-INVALID CONTROL VARIABLE SPECIFICATION
- 3-INVALID DATA VARIABLE SPECIFICATION
- 4-BUFFER OVERRUN (DATA MAY BE LOST)
- 5-ESC ENTERED DURING PROCESSOR OPERATION
- 6-NO ANSWER AFTER DIAL
- 7-OFFLINE ERROR

ACCESSING THE DATA VARIABLE (BLOCK MODE) RECEIVES
 ONE BLOCK

SPECIFYING THE DATA VARIABLE (BLOCK MODE) SENDS
 ONE BLOCK

APL/DTC GRAPHICS PROCESSOR (103)

CONTROL VARIABLE INITIAL VALUE: 'CTL'

DATA VARIABLE INITIAL VALUE: NONE

COMMANDS (SPECIFYING THE CONTROL VARIABLE)

- 0-SET MODE TO HIGH RESOLUTION (DEFAULT)
- 1-SET MODE TO GRAY SCALE
- 2-CLEAR SCREEN TO BLACK
- 3-INVERT SCREEN
- 4-CLEAR SCREEN TO WHITE

RETURN CODES (ACCESSING THE CONTROL VARIABLE)

RESULT IS 2 ELEMENT VECTOR GIVING RETURN CODE AND MODE

RETURN CODES

- 4-INCORRECT SHAPE
- 3-INCORRECT RANK
- 2-INCORRECT TYPE
- 1-INCORRECT INITIAL VALUES AT SHARE OFFER
- 0-SUCCESSFUL OPERATION
- N>0-DATA RANGE ERROR ON ROW N OF DATA VAR

MODE

- 0-HIGH RESOLUTION
- 1-GRAY SCALE

DRAWING (SPECIFYING THE DATA VARIABLE)

DATA VARIABLE MUST BE RANK 2, SHAPE N,3

MODE	RANGE	PIXEL
	COL 1 COL 2 COL 3	
	X Y	
0	0-255 0-240 0-3	
1	0-128 0-120 0-16	

PIXEL (MODE 0 HIGH RESOLUTION)

- 0-MOVE WITHOUT WRITING PIXELS
- 1-MOVE WRITING WHITE PIXELS
- 2-MOVE WRITING BLACK PIXELS
- 3-MOVE WRITING INVERTING PIXELS

PIXEL (MODE 1 GRAY SCALE)

- 0-MOVE WITHOUT WRITING PIXELS
- 1≤N≤16-MOVE WRITING PIXEL OF INTENSITY N

CURSOR LOCATION (ACCESSING THE DATA VAR)

RESULT IS A 2 ELEMENT VECTOR GIVING CURSOR X,Y

CONTROL VARIABLE INITIAL VALUE: 'CTL'

DATA VARIABLE INITIAL VALUE: 'UTDSSSSNNNNNNNN'

WHERE

U=The mass storage unit the file is on (0-9)
 T=The type of file (N=New, O=Old, M=Modify)
 D=The disposition of the file (K=Keep, D=Delete)
 S=The size of the file in 256 byte blocks. This field must have a 3 digit number, including leading zeros. This field can be all zeros if T=M or O.
 N=The name of the file

NOTES: T=O, or M can be used only if file was previously created.

T=M allows the user to open a file with the record pointer after the last record in the file.

All data written to this file will then be placed at the end. When T=O is coded the record pointer is placed at the beginning of the file, thus assuming update mode.

D=K tells the processor that the file is to be kept after the share is retracted.

D=D tells the processor that the file is to be deleted after the share is retracted.

Space allocation can be done using the formula $\lceil .5 * (\text{TYPE} * \text{PRECORD}) + 256 \rceil$ for each record.

TYPE=1 for binary and character data, 3 for integer, and 6 for floating point values.

RETURN CODES (Accessing the control variable)

- 0-Operation successful.
- 1-Invalid initial information in data or control variable.
- 2-No more disk space or allocated disk space used up.
- 3-I/O error.
- 4-Workspace full (on data variable reference only).
- 5-Wrong length record (during update only).
- 6-Attempt to specify control variable to be other than an integer between 0 and 252.
- 7-File not found (after share offer, with T=O or M).
- 8-Attempt to write past record 252.
- 9-End of file or attempting to read unwritten record in random access.

INDEXING A FILE (Specifying the control variable)

Specifying a value of N prepares processor to read or write record N. Sequential access is default if not specified. The record pointer is always incremented by 1 after read or write.

READING A RECORD (Accessing the data variable)

WRITING A RECORD (Specifying the data variable)

FUNCTION	NOTE	USE	SUBROUTINES	ORIGIN
DROP		GENERALIZED DYADIC DROP		ANY
FACT		FACTORIAL WITH GAMMA FUNCTION	GAMMA	ANY
GAMMA		SUBROUTINE FOR FACT	NONE	ANY
LAMINATE	(1)	GENERALIZED LAMINATE	NONE	ANY
MATDIV		MATRIX DIVIDE		1
MATINV		MATRIX INVERSE	MATDIV	1
REVERSE		GENERALIZED DYADIC REVERSAL ALONG THE LAST COORDINATE DIMENSION	NONE	ANY
ROTATE	(2)	GENERALIZED ROTATE	NONE	ANY
TAKE		GENERALIZED DYADIC TAKE	NONE	ANY
TRANSPOSE		GENERALIZED MONADIC TRANSPOSE	NONE	ANY

(1) LAMINATE REQUIRES THE VARIABLE 'I' TO BE SET TO THE COORDINATE DIMENSION THAT THE LAMINATION IS TO OCCUR OVER.

(2) ROTATE REQUIRES THAT THE VARIABLE 'I' BE SET TO THE COORDINATE DIMENSION THAT THE ROTATE IS TO OCCUR OVER.

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Example

This APL/V80 expression inputs a list of values (list B), computes the average of all items in the list, then prints the average:

$\square \leftarrow (+/B) \div \rho B \leftarrow \square$

In other languages, this expression may require at least one loop and perhaps 10 statements.

Example

This APL/V80 expression inputs a list of values (list A), sorts the list from lowest to highest values, and prints out all values in the list A in ascending order:

$\square \leftarrow A[\Delta A \leftarrow \square]$

In other languages, this expression usually takes two loops and 15 to 20 statements.

Example

This APL/V80 function computes the mean, variance, and standard deviation for a list called X:

```

V R=STATS X;N;M;VAR;SD
[1] R=N,VAR,SD=(VAR-(+/X-M*(+/X)*N)*2)/(N-1)+0.5
V

```

In other languages, a program equivalent to this can be quite cumbersome. When you try writing one, you'll find yourself wishing you had APL/V80 already.

Don't let the unusual symbols in APL/V80 worry you. APL has so many complete functions built into the language itself, there aren't enough letters in the English alphabet to give every function a unique single-character name. Of course, APL/V80 could name each function with four or five letters, as BASIC does, but that rapidly eats up memory. Besides, once you learn a language, you start using abbreviations anyway. APL/V80 lets you use abbreviations from the very beginning, saving memory space both in your head and in your machine.

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- dynamic execution of system commands
- auxiliary processor for interfacing I/O ports
- auxiliary processor for indexed file systems
- canonical representation, fix
- latent expression
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- ☐ for 80-char. video display (compatible w/Vect. Graph. & similar boards)

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<input type="checkbox"/> 8" floppy	<input type="checkbox"/> double	<input type="checkbox"/> OSI
	<input type="checkbox"/> quadruple	<input type="checkbox"/> Micropolis
		<input type="checkbox"/> North Star compatible

Accessories

- ☐ APL Video Character Generator ROM, \$25 (directly replaces MCM-6571-A to give true APL characters)
- ☐ APL/ASCII Character Generator Board, \$89.95, for Vector Graphic, Processor Technology, & similar boards

APL/V80™ User's Manual alone

- ☐ \$25

APL/DTC™ Hardware/Software Unit

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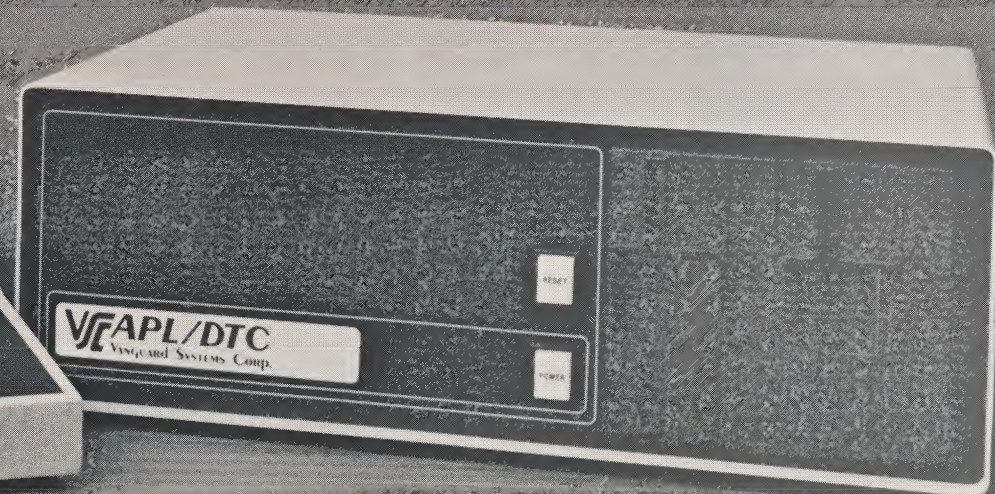
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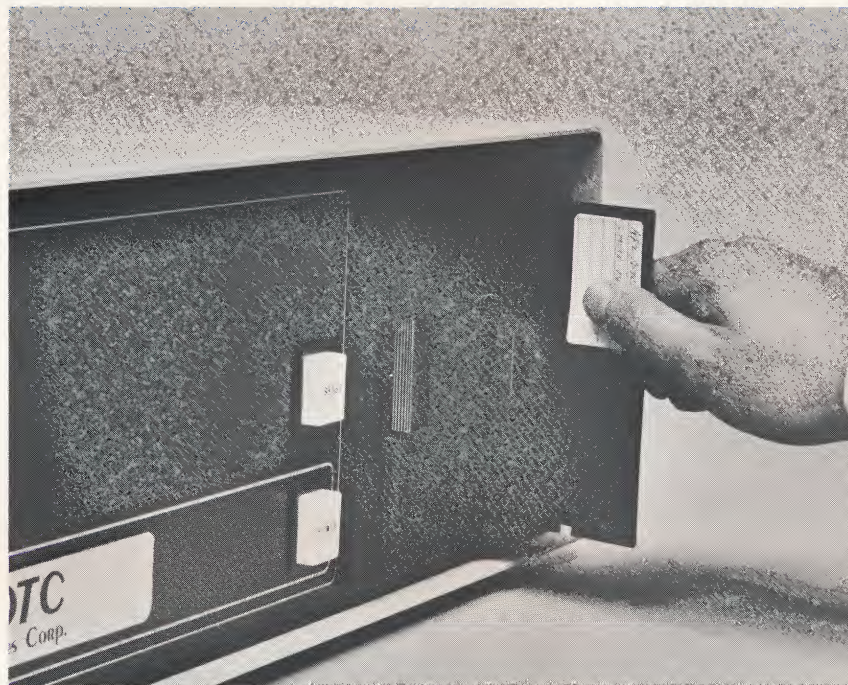
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Check these APL/ DTC™ language features:

- system variables, execute, & format are implemented
- disk workspace and copy object library
- shared variables
- arrays up to 8 dimensions
- dynamic execution of system commands
- auxiliary processor for interfacing I/O ports
- auxiliary processor for indexed file systems
- canonical representation, function fix
- share offer, share retract
- latent expression
- much more

this system is an enhanced version created specifically to run efficiently on Z80-based microcomputers. It includes standard APL arithmetic functions, plus boolean, relational, selectional, structural, and general functions such as execute and format. The language also contains system variables and system functions, such as canonical representation, function fix, share offer, and share retract. APL/ DTC APL has disk-based workspace and copy-object libraries, and supports arrays of up to 8 dimensions.



Vanguard System Corporation's APL/DTC packs CPU, auxiliary processors, and two quad-density mini-disk drives into one compact Desk-Top Computer (DTC).

The basic APL/ DTC system includes one auxiliary processor for interfacing Input/ Output ports, and another to implement a powerful indexed file system. Three additional auxiliary processors are available as options: one for data communications, one for high-resolution graphics manipulation, and one for analog-to-digital conversion for control applications.

File processor creates direct index system

The APL/ DTC's auxiliary file processor implements a unique indexable filing system. Each file component may be an APL array of any type, shape, or size (to limits of available workspace). Files are created sequentially, but once created, they can be read, written, or re-written in any order. Other processors are available to read CP/ M files, and to input or output through any APL/ DTC I/ O port.

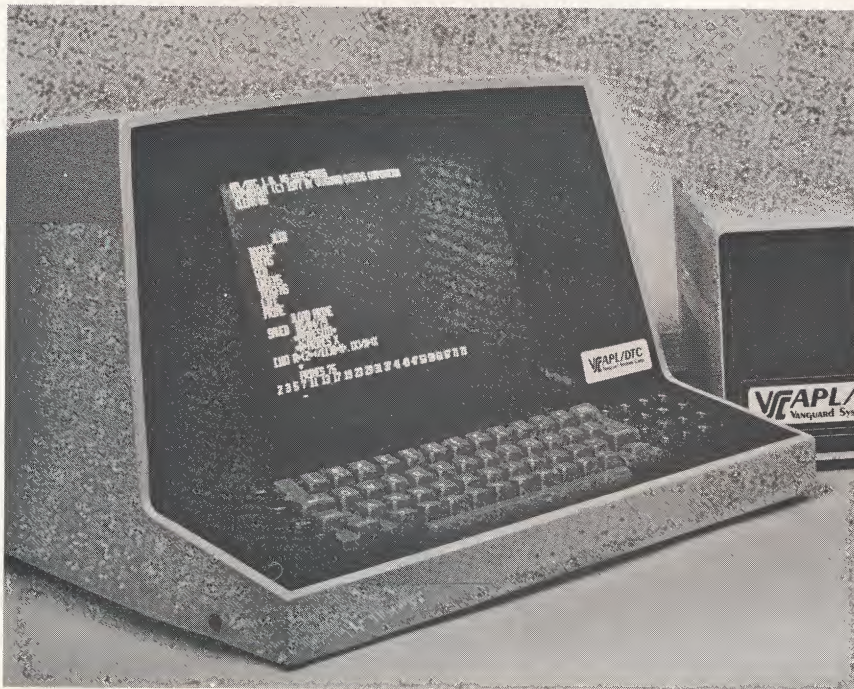
Security features protect your software

APL programs written for the APL/ DTC can be "locked", that is, set to execute only. Locked functions cannot be displayed or changed. This helps ensure no unauthorized changes can be made to your proprietary software. For further security, each APL/ DTC machine contains a unique serial number which can be accessed as a system variable. This feature allows an APL function to check the identity of the machine on which it is being run.

Every APL/ DTC custom-configured to fit your needs precisely

So far, we've described the basic APL/ DTC configuration. However, to be sure you get the most efficient APL system for your special needs, you have a wide choice of expansion options.

For machine-to-machine communication, you can pick our data communications option. This package includes a communications interface with built-in modem and auxiliary processor. If you need graphics capability, select our high-resolution graphics option. We'll equip your APL/ DTC with a 256 x 240 raster scan graphics display and associated auxiliary processor which can draw straight lines between any two addressable CRT display points.



The APL/DTC's video terminal combines a responsive APL keyboard with a high-resolution 12" diagonal CRT to make operator input simple and convenient. The display format is 24 eighty-character lines. The keyboard features a standard typewriter layout, auto-repeat keys, and APL/ ASCII keytops.

For hard-copy output, you can choose either the correspondence-quality daisy-wheel printer, or a 120 cps matrix printer. For extra on-line file storage, add 630k bytes with two more quad-density mini-disk drives, giving 1.2 million bytes disk storage total. To house your APL/ DTC, order our sleek, modern computer desk. The CPU and disk-drives mount underneath the top, the CRT sits on the top surface, leaving ample desk-top work area for you.

Standard CP/ M® Operating System gives language alternatives

The APL/ DTC uses a standard CP/ M operating system to let you run many languages besides APL. You can run optional software packages for BASIC, FORTRAN, COBOL, and PASCAL languages, use Z80 assemblers, and even word-processing software. This flexibility makes the APL/ DTC especially useful in educational applications.

We haven't forgotten about maintenance

If your APL/ DTC computer ever needs repairs, you'll find local service is available in many major metropolitan areas throughout the United States. We custom-configure your unit from proven, reliable components selected especially to give you dependable service and real value.

Having your own machine is the quickest way to solve your problems

The APL/ DTC's modest price puts real APL computing power under your personal control. No more waiting for time-sharing access. No more trips to some central computer location to run your problem. When you have an APL/ DTC, your solution is always waiting for you - sitting right on your desk. Your APL/ DTC is ready when you are. If you're now working in a multi-user mainframe APL environment, APL/ DTC's, used as distributed processing units, can significantly increase the amount of work your mainframe system can handle.

Order your APL/ DTC now

Delivery of your unit will normally occur 30 to 60 days after you order. So order today. . . a whole new world of problem-solving convenience will be yours with an APL/ DTC™ on your desk.

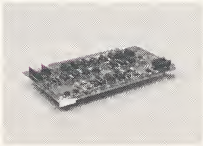
VSC VANGUARD SYSTEMS CORPORATION
6812 San Pedro
San Antonio, TX 78216
(512) 828 - 0554

Expand APL/DTC™ to fit your special needs



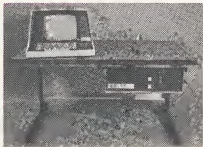
Correspondence-quality printer

Rugged daisy-wheel printer with interchangeable type capability. Prints at 55 cps through cloth or carbon-film ribbon for sharpest image quality.



Analog/ Digital conversion interface

Provides for up to 8 channels of analog input, 2 channels of analog output. Auxiliary processor lets APL functions control and monitor conversions, and react appropriately. Output channels can control servomotors and other analog devices. Monitor temperature and all other physical events which can be input as continuously-variable voltages.



Custom desk

Unique modern pedestal desk mounts APL/DTC CPU and disk drives, and gives ample area for CRT display and work area.



More disk drives

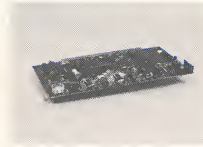
Greater data storage capability is yours with up to two additional quad-density mini-disk drives. Two extra drives add a total of 630k bytes of random-access storage, for a system total of 1.2 million bytes.

Applications Workspaces

- Simulation of APL*PLUS® file system
- keyed Indexed Sequential Access Method (ISAM)
- Inventory Control
- General Ledger
- Financial Analysis
- Text Editor
- Check Management
- Cash Flow Analysis
- Inventory Modeling
- Statistical Analysis

APL Functions in the APL/DTC™

- Arithmetic:
+ - × ÷ * ♂ ○ | ⌈ ⌋ !
- Boolean & Relational:
∧ ∨ ~ < ≤ ≥ > ≠
- Selection & Structural:
/ \ [;] † ‡ ρ, ♂
- General:
ε 1 ? 1 T ⌞ ⌟ ⌠ ⌡



Data communications package

An auxiliary processor with built-in modem for serial RS-232 transmission. Attaches directly to telephone lines. Processor allows APL programs to "answer" or "dial", as well as to control file transfers and to emulate a terminal.

Medium-speed matrix printer

Clear dot-matrix images, and higher print speed than our daisy-wheel printer. This option prints at 120 cps for rapid hard-copy report generation.

High-resolution graphics package

A graphics display interface with 256 x 240 bit-mapped raster scan display or 128 x 120 gray-scale display. Auxiliary processor draws straight lines between programmable points, under software control. Display modes include white-on-black, black-on-white, and inverted. When operating in gray-scale, each picture element has 16 programmable levels of gray. Processor accepts matrix data structure to simplify graphics programming.

Other options

- 12" diagonal 700-line high-resolution video monitor
- word-processor software
- FORTRAN
- COBOL
- BASIC
- Z-80 Macro Assembler
- PASCAL
- C

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